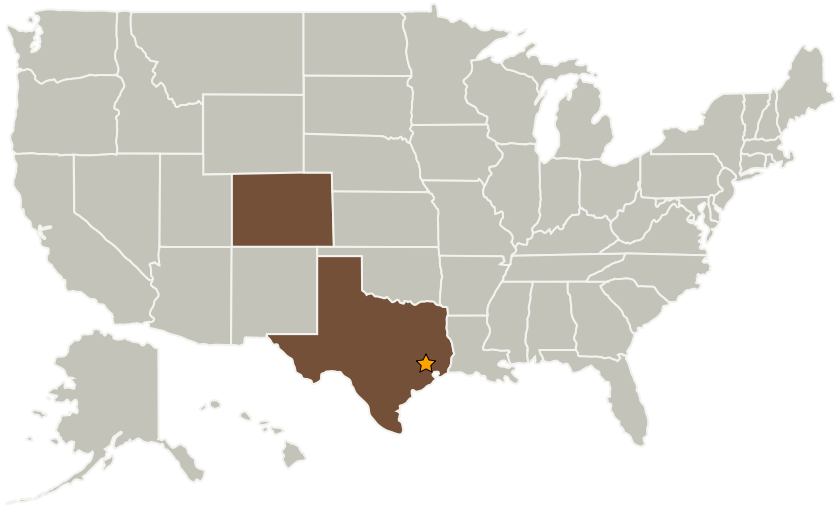
MPED: An ISRU Bucket Ladder Excavator Demonstrator System, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

The proposed innovation is a planetary surface tool called the Multi Purpose Excavation Demonstrator (MPED), which is intended to both extract Lunar Soil to feed an in-situ resource utilization (ISRU) processing plant, and to perform lunar civil engineering applications. The proposed MPED prototype is an excavation tool known as a 'bucket ladder,' a device with a long heritage of industrial use that is intrinsically abrasion and dust-resistant. The device will be a prototype bucket ladder excavation tool with a pivot arm, and will have a target mass of 20kg and a target production rate of 500kg/hr. It is intended to be integrated into a roughly 80kg mobile platform for a total projected mobile system mass of 100kg. The system will be designed for minimum power consumption for the lunar case, with a target power consumption of less than 200 watts for the terrestrial demonstrator (note: lunar power consumption is expected to be lower due to gravitational differences). Productivity goals include a maximum berm height of 3 meters (based upon multiple passes), a single-pass excavation depth of 30 cm (with a width of between 10 and 25 cm), and a multi-pass road width of 4 meters.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
sysRAND Corporation	Supporting Organization	Industry	Parker, Colorado

Primary U.S. Work Locations	
Colorado	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.4 Mission Success Technologies
    - TX13.4.6 Ground Analogs for Space/Surface Systems